

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
15 July 2004 (15.07.2004)

PCT

(10) International Publication Number
WO 2004/059122 A1

(51) International Patent Classification⁷: **E21B 44/00**,
47/00

(21) International Application Number:
PCT/EP2003/013145

(22) International Filing Date:
21 November 2003 (21.11.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
02293282.6 31 December 2002 (31.12.2002) EP

(71) Applicant (for FR only): **SERVICES PETROLIERS
SCHLUMBERGER** [FR/FR]; 42, rue Saint-Dominique,
F-75007 Paris (FR).

(71) Applicant (for all designated States except BF, BJ, BR, CA,
CF, CG, CI, CM, CN, CZ, FR, GA, GB, GN, GQ, GW, IN,

JP, LT, MA, ML, MR, NE, NL, OM, SD, SN, TD, TG, TN,
TR, TT, US, VN): **SCHLUMBERGER TECHNOLOGY
B.V.** [NL/NL]; Parkstraat 83-89, NL-2514 JG The Hague
(NL).

(71) Applicant (for GB, JP, NL only): **SCHLUMBERGER
HOLDINGS LIMITED** [—/—]; P.O. Box 71, Craigmuir
Chambers, Road Town, Tortola (VG).

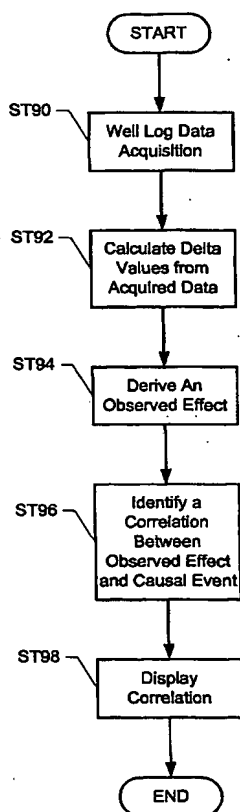
(71) Applicant (for CA only): **SCHLUMBERGER CANADA
LIMITED** [CA/CA]; 24th Floor, Monenco Place, 801 6th
Avenue SW, Calgary, Alberta (CA).

(71) Applicant (for BF, BJ, CF, CG, CI, CM, CZ, GA, GN, GQ,
GW, IN, LT, MA, ML, MR, NE, SN, TD, TG, TN, VN only):
PETROLEUM RESEARCH & DEVELOPMENT N.V.
[NL/NL]; De Ruyterkade 62, Willemstad, Curacao (NL).

(71) Applicant (for CN only): **SCHLUMBERGER OVER-
SEAS S.A.** [PA/PA]; 8 Calle Aquilino de la Guardia,
Panama City (PA).

[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR CAUSE-EFFECT TIME LAPSE ANALYSIS



(57) Abstract: A method of evaluating changes for a wellbore interval involves acquiring a first log data from a logging sensor during a first pass over the wellbore interval, acquiring a second log data from the logging sensor during a second pass over the wellbore interval, calculating a plurality of delta values between the first log data and the second log data, deriving an observed effect using the plurality of the delta values, identifying a correlation between the observed effect and a casual event, and displaying the correlation on a display device.



- (71) Applicant (*for OM, SD, SY, TR only*): **SCHLUMBERGER OILFIELD ASSISTANCE LIMITED** [PA/PA]; 8 Calle Aquilino de la Guardia, Panama City (PA).
- (71) Applicant (*for BR only*): **SCHLUMBERGER SURENCO S.A.** [PA/PA]; 8 Calle Aquilino de la Guardia, Panama City (PA).
- (71) Applicant (*for TT only*): **SCHLUMBERGER SERVICES LIMITED** [—/—]; P.O. Box 438, Tortola, British Virgin Islands (VG).
- (71) Applicant (*for EG only*): **SCHLUMBERGER SEACO INC.** [PA/PA]; 8 Calle Aquilino de la Guardia, Panama City (PA).
- (72) Inventor; and
- (75) Inventor/Applicant (*for US only*): **GRIFFITHS, Roger** [AU/AE]; c/o Schlumberger Middle East S.A., P.O. Box 21, Abu Dhabi (AE).
- (74) Agent: **RAYBAUD, Hélène**; Etudes & Productions Schlumberger, 1, rue Henri Becquerel - BP 202, F-92142 Clamart Cedex (FR).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
- with international search report
 - before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*